



Phyto-pharmacological review of *Portulaca quadrifida* Linn.

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Portulaca quadrifida Linn. (Family: Portulacaceae), commonly known as “Chicken Weed”, a traditional medicinal plant has been used in the Ayurvedic system of medicine for centuries, valued for its benefits in the management of urinary and inflammatory disorders. The juice of leaves is applied to abscesses and decoction is given in dysentery. The decoction of the plant can act as anthelmintic and used in the treatment of stomach complaints and gonorrhoea. *Portulaca quadrifida* has been reported to possess antifungal activity. The effect of ethanolic extract of *Portulaca quadrifida* on central and peripheral nervous system were studied by using spontaneous motor activity, in vivo muscle relaxant activity (Grip strength) and anticonvulsant activity and it is also found to have good effect on central nervous system. In this review, we have explored the Phyto-pharmacological properties of the *Portulaca quadrifida* plant and compiled its vast pharmacological applications to comprehend and synthesize the subject of its potential image of multipurpose medicinal agents.

Keywords: *Portulaca quadrifida*; Anthelmintic; Central nervous system; Anticonvulsant; Antifungal activity.

INTRODUCTION

Since immemorial man has been in search for plant, animal and other materials that can be used to take care of the pains, deformities ailments and diseases that inflict some of the unfortunate member of our society. Although modern medicine or allopathic has been accepted by a large portion of the population of the world, only in recent years has there been a new look at natural remedies, home remedies and simple ways of using plant material which are so easily available in one's own backyard or in the neighbourhood [1-3]. The World Health Organization (WHO) estimates that about 80% of people living in developing countries rely almost exclusively on traditional medicines for their primary health care needs. Since the medicinal plants are backbone of the traditional medicine, this means that, 33,000 million people in the under developed countries where there has been a great fascination for the herbal medicines and dietary food supplement in the last decade [4-5]. Herbs have been used to promote good health since ancient times. Herbal remedies use the whole plants: powdered so they can be swallowed, drunk as a tincture, decoction

or infusion, or mixed with an oil-based carrier to form an ointment. In general herbal medicines have a gentle action and may take a number of weeks to achieve their effect. With herbal medicines the overall effect is usually due to a combination of natural constituents which modify each other's action [6-8].

Portulaca quadrifida Linn. belongs to the family Portulacaceae. It is a small diffused, succulent, annual herb found throughout the tropical parts of India. It is used as a vegetable and also used for various curative purposes. It is said to be useful in asthma, cough, urinary discharges, inflammations and ulcers. In Rajasthan, the leaves are used in preparing bread by mixing with Bajra. In Tamil Nadu, leaves and tender shoots cooked and eaten as greens. A poultice of the plant is applied in abdominal complaints, erysipelas and haemorrhoids [9]. *Portulaca quadrifida* Linn. has been reported to possess antifungal activity against *Aspergillus fumigates* and *Candida albicans*. In Indo-China the juice of leaves is applied to abscesses and used as a collyrium; a decoction is given in dysentery. In nigeria the leaves are used as a local application to swellings [10].

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Fig 1: The flower parts



Fig 2: Whole plant

Phytoconstituents from *Portulaca quadrifida*

Preliminary phytochemical analysis of different extracts was carried out. The results were positive for tannins, flavonoids and triterpenoids in petroleum ether extract. Chloroform extract showed positive test for tannins only, ethanolic extract exhibited positive test for alkaloids, flavonoids, triterpenoids, glycosides, tannins, amino acids and saponins where as aqueous extract was found to be positive for flavonoids, alkaloids, carbohydrates, glycosides, amino acids and saponins. These secondary metabolites are the active constituents of *Portulaca quadrifida* Linn. may be responsible for its pharmacological activities.

Pharmacological Studies of *Portulaca quadrifida*

The plant *Portulaca quadrifida* is commonly known as 'Chicken Weed', widely used as green vegetable, described in the Ayurvedic Literature. But some of the important pharmacological activity is being described briefly in the following-

Inflammation

The leaves are used as a local application to inflammation. The ethanol extract of the plant was used

for the investigation of anti-inflammatory activity against carrageenan-induced inflammation. Orally administered extracts (dose-40 & 80 mg/kg, resp.), inhibited both the acute and chronic phases of this experimental model of inflammation. The extract exhibited potential anti-inflammatory activity throughout the experiment and effective as reference drug (Phenylbutazone, 80mg/kg, intraperitoneally) ^[10].

Antifungal activity

It has been reported to possess antifungal activity against *Aspergillus fumigates* and *Candida albicans*. The antifungal activity of six fractions derived from plant extract was investigated in an *in vitro* system. Methanol extracts had the strongest activity in these fractions. The growth of both *Aspergillus fumigates* and *Candida albicans* was inhibited by the extract at less than 20 micrograms/ml. Ayurvedic studies had been proved that the plant is very effective in the treatment for athlete's foot and other fungal infections ^[11].

Neuropharmacological Activity

Some neuro pharmacological effects of ethanol extract were studied in mice using various models. The effect of ethanol extract of *Portulaca quadrifida* Linn. on central and peripheral nervous system were studied by using spontaneous motor activity, antinociceptive activity and *in vivo* muscle relaxant activity. The extract (400 and 800mg/kg intraperitoneally dose) showed a significant reduction in spontaneous motor activity and antinociceptive activity ^[12].

Gastrointestinal Disorders

In vitro, animal studies have investigated the effects of the extract on the gastrointestinal tract. *In vitro* studies have demonstrated direct spasmolytic activity on intestinal smooth muscle ^[13].

The study suggests the protective and curative effects over gastric ulcers. A recent *in vitro* study of *Portulaca* extract demonstrated the anti-microbial activity against *Helicobacter pylori*, bacteria responsible for chronic gastric ulcers ^[14].

Dysentery

The juice of leaves is applied to abscesses and used as a collyrium; a decoction is given in dysentery. A detail study was carried out by using the extract on the rat intestinal epithelia. The effects of ions were determined before and after the administration of the extracts (100 & 200 mg/kg) on the basis of their ion exchange specially Na and Cl ions ^[15].

Anticonvulsant

Intraperitoneal administration of the ethanolic extract is showing a significant reduction in time to recover from the electrically induced convulsions. Convulsions were induced in mice through an electric shock (150 mA) using Electro-convulsometer. Phenytoin sodium (30 mg/kg) was used as the standard drug. The time of recovery of animals from convulsions in all the groups was recorded ^[13,16].

CONCLUSION:

The world has now been immeasurably fascinated by the medicinal and their miraculous results in all respects. Critical assessment of literature to date and aims to show that genus and its pharmaceutical potential has been underestimated. Actually, it requires attention at microscopic level. Genus is counted to be a type of weed and the weeds are defined to, “a plant whose virtues have not been yet discovered and a plant in wrong place.” This reflects negative nature of weeds. The persona from the medical world runs after those plants who have been seated in the range of medicinal plants.

Portulaca quadrifida Linn. is enriched with flavonoids, saponins, vitamins, glycosides and other secondary metabolites. Clearly, it possesses significant pharmacological potential and promising activities of the extracts in the context of ethnomedicinal knowledge. The therapeutic efficacy of *Portulaca quadrifida* is extensively used in Indian system of medicine has been established through modern testing and evaluation (preclinical and clinical trials) indifferent disease conditions. These studies are establishing the drug in the development for the

treatment of various diseases like neurological problems, convulsion, inflammation, dysentery, gastrointestinal disorders and in case of some carcinogenic diseases also. With only a few exceptions, the pharmacological studies have focused mainly on crude extracts, and many of Phytoconstituents with its putative mechanisms responsible for different pharmacological actions, remain unknown. The collected information provides a resource for future characterization about the plant *Portulaca quadrifida* in terms of ethno pharmacological, phytochemical and biological standards.

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